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Nothoaspis reddelli Keirans & Clifford, 1975 (Acari, Ixodida, Argasidae): distribution extension

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Abstract: The first record of *Nothoaspis reddelli* (nymph) in Nicaragua is presented. The morphological characters used for the determination were dorsum with a false shield or nothoaspis, presence of an anteriorly projecting hood covering half of the capitulum, medial extension of palpal article I (flaps), presence of two large setae on internal margins of flaps, leg coxae with numerous long setae, and hypostome long and pointed with apical dentition 4/4. The 16S rDNA sequence of *N. reddelli* from Nicaragua was identical to the 16S sequence of *N. reddelli* from Mexico.

Key words: Ixodida, Argasidae, Nicaragua

The tick fauna of Nicaragua is composed by 24 species, 10 of the family Argasidae and 14 belonging to the family Ixodidae (Maes et al. 1989; Guglielmone et al. 2003). Particularly in the case of Argasidae, the tick species recorded in Nicaragua are *Argas persicus* Oken, 1818, *Ornithodoros brodyi* Matheson, 1935, *Ornithodoros casebeeri* Jones & Clifford, 1972, *Ornithodoros chironectes* Jones & Clifford, 1972, *Ornithodoros clarki* Jones & Clifford, 1972, *Ornithodoros hasei* (Schulze, 1935), *Ornithodoros knoxjonesi* Jones & Clifford, 1972, *Ornithodoros puertoricensis* Fox, 1947, *Ornithodoros stageri* Cooley & Kohls, 1941, *Ornithodoros yumatensis* Cooley & Kohls, 1941 and *Otobius megnini* Duges, 1833 (Maes et al. 1989; Guglielmone et al. 2003). On 31 May 2012, we collected a free-living tick of the family Argasidae inside a bat cave in Rincon Garcia, Villa Nueva municipality, Chinandega department, Nicaragua (12°55′50″ N, 086°46′47″ W; elevation 75 m). The cave was a mine that had been abandoned for more than 30 years, inhabited by a large number of bats of the species *Pteronotus gymnonotus* Natterer, 1843 (Mormoopidae). The internal temperature of the cave recorded during sampling was 32–36°C; the atmosphere in the cave was noisome and rich in nitrogen compounds.

Determination of the tick was performed by means of examination of morphological characters and by analysis of mitochondrial 16rDNA sequences, which were obtained by using the methodology and primers described in Mangold et al. (1998). The sequence of the specimen collected in Rincon Garcia was compared with the sequences of argasid tick species deposited in GenBank. The number of variable nucleotide positions between haplotypes was used to calculate pairwise estimates of percent sequence divergence for 16S rDNA with Mega 4.0 (Tamura et al. 2007).

The tick was determined as a nymph (probably nymph II) of *Nothoaspis reddelli* Keirans & Clifford, 1975 following the descriptions of immature stages of *Nothoaspis* species of Keirans et al. (1977) and Nava et al. (2010). The diagnostic characters are a combination of dorsum with a false shield or nothoaspis, presence of an anteriorly projecting hood covering a half of the capitulum, medial extension of palpal article I (flaps) forming a ventral sheath, presence of two large setae on flap internal margins, leg coxae with numerous long setae, and hypostme long and pointed with apical dentition 4/4. The specimen is deposited in the Coleção Nacional de Carrapatos (CNC) of the Faculdade de Medicina Veterinária e Zootecnia, Universidade de São Paulo, São Paulo, Brazil (CNC-2287). The 16S rDNA sequence of *N. reddelli* from Nicaragua (GenBank accession number KC522603) was identical to the 16S rDNA sequence of *N. reddelli* from Mexico (GenBank accession number JQ403280). Pairwise genetic

difference between these two sequences and the 16S sequence of the other species of this genus, *Nothoaspis amazoniensis* Nava, Venzal & Labruna, 2010 (GenBank accession number HM047066), was 6.9%. The genetic divergence among *N. reddelli* from Nicaragua and the remaining Neotropical species of Argasidae was higher than 10%.

The data presented in this work constitute the first record of *N. reddelli* in Nicaragua, adding a new species to the tick fauna of this country. To date, *N. reddelli* had only been reported in Mexico (Keirans and Clifford 1975; Guzmán-Cornejo et al. 2012). The enlargement of the distribution of this species is not unexpected, because the hosts for larvae of the genus *Nothoaspis* (there are no records of nymphs and adults attached to a host) are bats (Nava et al. 2010), which are mammals with a recognized vagility (Popa-Lisseanu and Voigt 2009). Although *Nothoaspis* has a wide distribution in the Neotropical region, from Mexico to the Amazonian region of Brazil, the two species of this genus appear to have strong habitat specificity, because all findings were made in hot and humid caves inhabited by large colonies of bats (Keirans and Clifford 1975; Nava et al. 2010; Guzmán-Cornejo et al. 2012). Considering that host is not a limiting factor, it can be concluded that the potential distribution of *Nothoaspis* species is determined by the presence of caves colonized by bats with high temperature and humidity.

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